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Wildlife — and Land Use Patterns

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WILD creatures, like ourselves, are dependent on the land, and if we are to continue to have them with us, we must see to it that enough land is theirs too. I mean this in a very broad sense. We should set aside many areas that are especially suited to wildlife—but beyond this we shall need to see that all our land programs take wildlife into consideration. . . . It is my conviction that we shall restore our wildlife to something approaching its former abundance only by devoting more attention to wildlife in connection with all our activities—continuing of course our control of hunting and our provision for sanctuaries, but at the same time making wildlife at home almost everywhere.

Henry A. Wallace.

WILDLIFE
and
LAND USE PATTERNS

by

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VT-237

The Soil Conservation Service is indebted to the Fish and Wildlife Service (BS, F&WS) and National Park Service (NPS) of the Department of Interior, and the Bureau of Entomology and Plant Quarantine (BEPQ) and Forest Service (FS) of the Department of Agriculture for certain of the illustrations used in this publication and identified by the initials below the pictures. Acknowledgment is also made to Mr. J. K. Doutt for permission to use the photograph of the raccoon on the back cover, to the Indiana Department of Conservation for that on page 63, and to C. R. Enlow for the photograph on page 15.

INTRODUCTION

Of all the things that affect the lives of wild creatures, the greatest influence is that exerted by the varied pattern of vegetation that is spread over the land. As this pattern changes, the animals associated with the vegetation also change. Wherever the pattern is favorable to wildlife, there wildlife is abundant—if not overhunted. Wherever the pattern is unfavorable, there wildlife is scarce.

From the beginning of settlement in the United States, land patterns—embracing also the vegetation—have been changing on a large scale. Civilization has not destroyed wildlife. It has, however, exerted an enormous influence upon its composition. Where big-game animals formerly thrived in amazing numbers, conversion of wild land to farms and ranches has brought about an entirely different wildlife population. Quail of many kinds, doves, raccoons, and cottontails can live successfully under proper agricultural conditions, and many animals such as these have increased while the larger animals were decreasing.

For antelope and elk, buffalo and bear, ducks and geese, refuges on wild lands have been provided by the State. This is a necessary and vital step in conservation. But for wildlife of farm and ranch, there can be no place unless it is granted by the human occupants of the same territory. Today 85 percent of the land in the United States is used in one way or another for agricultural purposes. Since wildlife is a product of the land, it becomes at once apparent that whether or not there is an abundance of wildlife depends chiefly upon the character of the land patterns developed in pursuit of agriculture.

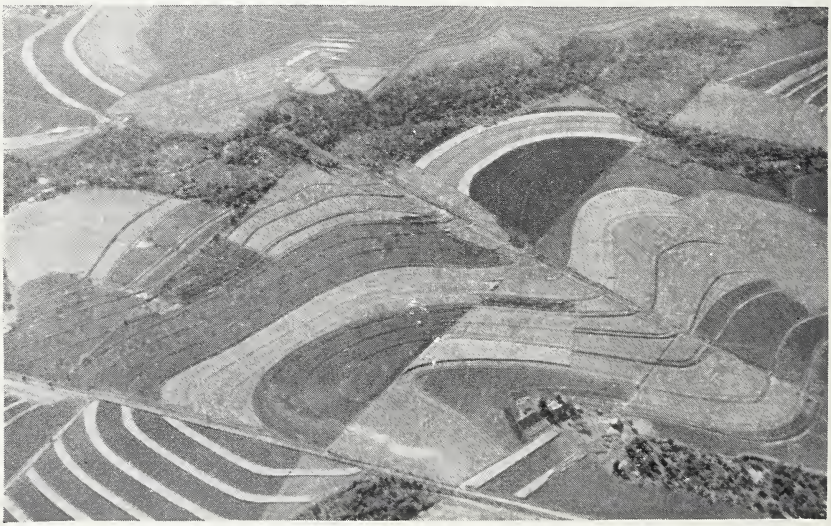
The wildlife that lives upon agricultural land has long been known to be of very considerable importance to agriculture itself. The birds and mammals that feed wholly or in part on insects exercise a substantial repressive action upon pests that take a toll of cultivated crops despite everything man can do. The unrelenting search for food by hawks and owls does much to reduce the depredations of mice, rats, and other rodents that make up a large part of their normal diet.

For reasons such as these, and because of the supplemental income that may be derived from the hunting of game and the trapping of fur, those who practice agriculture have a very real interest in encouraging wildlife. Yet so far as human intervention is concerned, wildlife production is, more often than not, accidental.

This need not be so. Wildlife possibilities are a function of land fertility as expressed in variety and luxuriance of vegetation. The better the condition in which the land is maintained, the greater are its potentialities both for crop production and wildlife production. The most essential factor in the maintenance of fertility—even in the retention of the soil—is the management of vegetation so as to insure adequate protection for the soil against the destruction wrought by the elements. Land must not be divested of every bit of vegetation other than that which is used for cash crop or forage. Deliberate attention must be given to vegetational patterns for the good of the land itself. At the same time, and without extra effort, these patterns may be arranged to benefit wildlife. It is the purpose of this publication to suggest the ways.

It is well to consider that patterns of vegetation sometimes are deceptive. An area that appears to be covered by woodland when viewed from above, may be found to have its lower levels of vegetation denuded of ground cover as a result of overgrazing. A herbaceous cover may seem to clothe the soil securely against the action of wind or driving rain, yet careful scrutiny may reveal pronounced differences, for example, between lush and sparse grasses. In analyzing patterns of vegetation, therefore, it is important to consider the quality of the plants that form them. Not all plants are good for land. Some provide better wildlife habitats than others. Variety, of course, is part of the pattern.

In these pages, vegetational patterns most certain to result in abundant wildlife are illustrated and discussed. Frequent consideration is given to the soil that supports the pattern, for in final analysis all wildlife depends upon the soil. The presence or absence of wildlife is a measure of the health of the land.



TEX—100,290

THE NEEDS OF WILDLIFE

There are three things wild creatures must have in order to survive. These are: Cover, food, and water. Each is essential and all must be available, and they rank in priority of importance to land animals in about the order stated. Very often there may be plenty of food and water, but no nearby cover; there might as well be no food since, without cover, wildlife will not use the food. Again there may be an abundance of cover, but little food or water, in which case the cover will be largely unoccupied. Wherever all three occur plentifully and are well distributed, wildlife will ordinarily be found in abundance, if it is not overhunted.

COVER

Any vegetation luxuriant enough to hide a wild creature forms what is called cover for that species. Within the safety of proper kinds of vegetation, wildlife can feed, rest, sleep, and raise young secure from attack by all enemies except man. A brushy fence row, a grapevine tangle, a clump of wild blackberries, or a tussock of grass—any of these may serve as some class of cover for some kind of wildlife. Obviously, cover to hide a sparrow need be much less junglelike than that required to conceal a deer, which is undoubtedly one reason why big game has passed from agricultural areas. But proper kinds of cover in adequate amount every species of animal must have, throughout its life, if it is to maintain itself.

No wild species is without its enemies. And the first thing a wild animal does when danger appears, is to make a dash for the nearest place of refuge. Cover that affords protection against sudden attack is classed by biologists as escape cover. Special names also have been given to various other classes of cover associated with particular activities of wild animals.

Nesting cover, for example, is a very important type, and on its presence depends the perpetuation of many wild species. If there is no place where a brood of young birds safely may be cared for until the fledglings can shift for themselves, such birds scarcely can be expected to survive. Nesting cover may be used only during the breeding season, but in that season is absolutely necessary.

Winter cover also is of great importance to wildlife, particularly in regions where snow lies long on the ground. There, evergreens, such as the conifers, are particularly effective. Refuge cover, from which hunters cannot drive game often may be of critical significance to game populations. A large acreage of brush may have only a few places where good escape cover can be found. In such a situation quality of cover means much more than quantity.

MISS—50.070

The hawthorn is at once both escape cover and nesting cover. Although it offers no concealment during winter, it still would deter even the rashest hawk from further pursuit of prey that had attained haven among its stiff, thorny, interlaced branches. Nests of three seasons attest appreciation by mockingbirds of its sturdy support and thick, leafy canopy during spring and summer.

N D–246

Luxuriant grass also may serve more than one purpose as wildlife cover. It is used for simple concealment, for escape, or for nesting—as illustrated by the nest of the mallard.

MINN–845

Grass provides a good protective covering for the soil, even in drainageways, through which much water may flow after rains. Grass is a cover that should be found in abundance on every farm, for the good of the land itself.

10.309

10.862

Cover that produces food is doubly valuable. Actually most vegetal cover provides food of one kind or another for some kind of wild creature. Both fruits and leaves may be eaten, and sometimes the bark. Holly and hobble-bush provide fruits useful to birds, and good cover as well.

FOOD

What wildlife may eat is not only a subject of academic interest, it is also a matter of considerable practical importance to agriculture, so much so that the Federal Government more than 50 years ago established a laboratory especially to study the food habits of native American birds and mammals. The work has since been carried on assiduously by the Bureau of Biological Survey (since June 30, 1940, the U. S. Fish and Wildlife Service, Department of Interior), and its files now contain analyses of the contents of tens of thousands of crops and stomachs, representing a large proportion of the bird and mammal species of the country.

BS-B-2467-

The staple diets of all important species now are known to a fair degree of certainty and it can be stated with assurance that most birds of farm and ranch and many of the small mammals work unceasingly in the farmer's interest. Consider, for instance, the number of mice represented by a pile of skulls beneath a barn owl's roost.

Many animals eat different things in different seasons. Many young birds, for example, live largely on insects, later feeding on vegetable matter as well

BS-B-71-M

BS-31.547

Most animals eat different things in different seasons. Many young birds, such as the catbirds, live largely on insects provided by the parents, or obtained by foraging. As the birds grow, they may change to a diet of seeds and berries, or perhaps leaves and buds. For most species, variety seems to be essential.

55.703

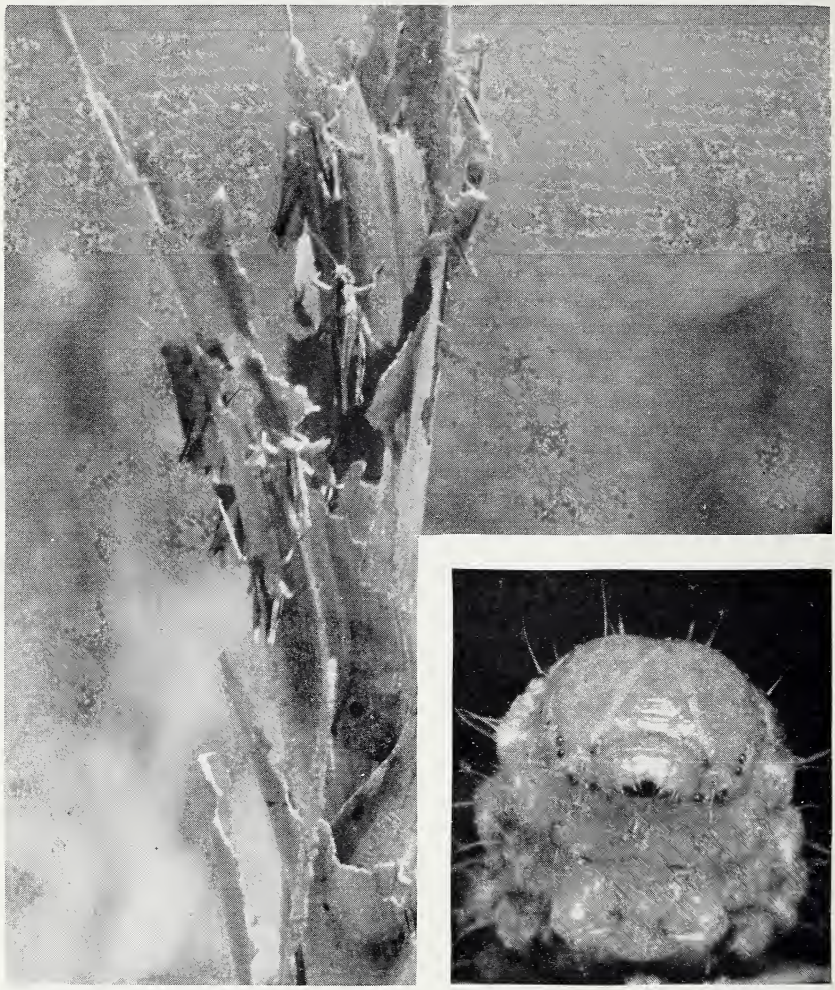
Summer and fall are generally seasons of plenty. Seeds and fruits are ripening, insects are abundant, and there is usually more food than the wildlife can ever consume. In late winter and early spring, however, wildlife that does not hibernate or go south may often have difficulty in finding enough to eat. This is particularly true where snow lies on the ground for a long time. In such sections, especially in severe seasons, wild birds and mammals must eat almost any food available, even if it has but little sustenance value, in order to survive.

PA—10,040

The best all-round food to carry ordinary farm wildlife over the critical periods is common field corn. Shocks placed near thickets serve as protection from biting winds and as a winter larder for game, but two or three border rows left uncut along a fence row or wood lot are equally appreciated, by both birds and mammals, as the squirrel and pheasant below attest.

PA-1361

Corn is eaten avidly by hundreds of species of animals, sometimes to the extent of severe injury to the crop. The greatest injury, of course, is the despoilment by insects during the growing season. It is then that many kinds of wildlife that were dependent upon the farmer's bounty to get through the winter are his most effective allies.

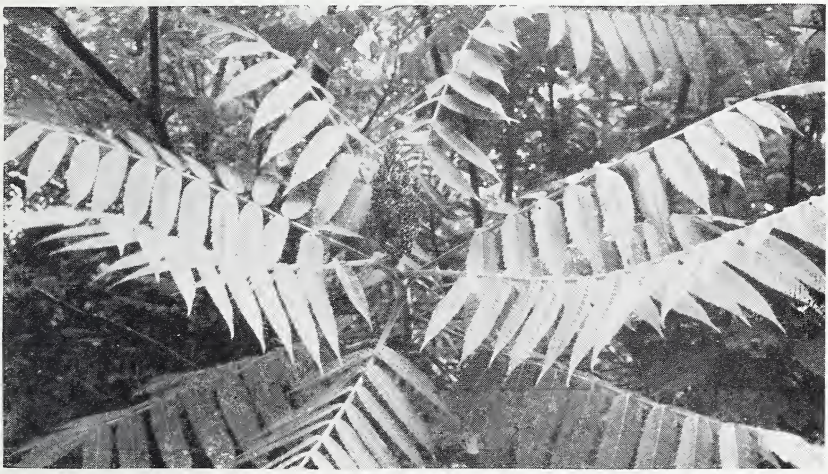


KANS-5135 BEPQ-TC-2949

Jays, pheasants, quail, in fact most of the birds that winter on northern farms eat great quantities of grasshoppers during summer, as do skunks and raccoons. The corn earworm shown here much enlarged, is dug out and eaten by various woodpeckers and other birds.

55,552

Acorns are a staple source of food for a great number of wild creatures. Like corn, they are capable of sustaining life for long periods in almost entire absence of other foods. Squirrels, bears, raccoons, turkeys, bandtailed pigeons, doves, quail, grouse, many ducks, and a host of other animals depend largely upon acorns for their fall and winter food supply.



55,347

Sumac fruits are a last resort. Like many other more or less dry fruits, they persist on the bush over winter, and serve as an emergency wildlife ration when other foods of winter birds have become exhausted or unavailable because of deep snow.

OHIO—30,695

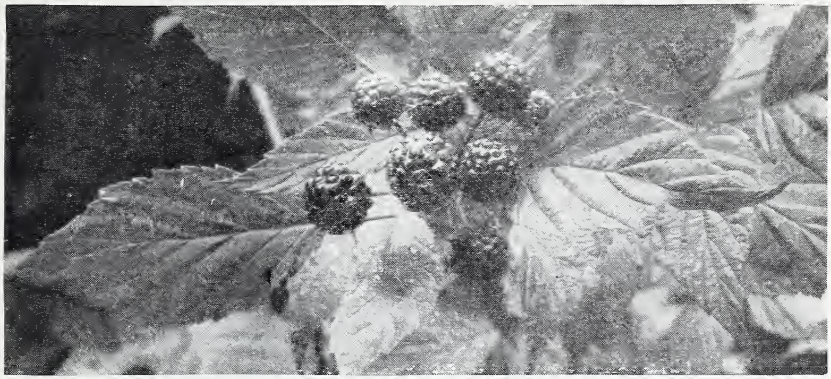
Rabbits and clover are as inseparable as robins and cherries. Clover is a member of the family of plants known as legumes, which includes alfalfa, partridge-peas, and wild beans. Many legumes are important sources of food, especially for quail. The more legumes there are in the land's vegetation, the more acceptable the area is to these upland game birds. Legumes are also preeminently soil-improving plants, adding nitrogen as well as organic matter to the soil; so, likewise, the more there are on the farm, the better it will be for the land. Farmers know this well; that is why legumes are used in so many crop rotations.

IOWA—900

There is a host of plants usually classed as weeds, although not necessarily obnoxious, that supply a large amount of food for both song and game birds. Barnyard grass, smartweed, and sorrel are examples of such food species. These unwanted plants may provide the only cover for soil and wildlife. They represent the first stage in the natural reclothing of soil.

WATER

Free water, obtained from such sources as rain, snow, or bodies of water, is not essential to some quail, rabbits, and rodents, but its absence may be the limiting factor in a locality otherwise favorable for other kinds of wildlife. For these animals, both food and water must be accessible within safe foraging distance from acceptable cover.



55,385

Animals that do not require free water nevertheless must ingest water in some form, either as dew or in the juices of fruits or other succulent vegetation. Berries of all kinds are extensively utilized in this way, notably the many species of wild blackberries (shown here) and raspberries, some of which grow in every part of the country.

55,341

Mulberries, probably the most attractive of all fruits to birds, are relished by hundreds of varieties of wildlife.

Aquatic and semiaquatic animals demand not only free water, but open water. For them, therefore, the land pattern must include lakes or ponds, or at least streams with pools. Such extensive waters are needed neither for drinking nor for bathing; rather, they serve much the same protective function for water dwellers, as does vegetation for upland animals. Surprisingly small bodies of water are useful to a variety of wildlife.

VA-10,358

Although completely exposed over water, this Canada goose probably is safe from ordinary enemies.

S DAK-10,432

Man himself is generally the only enemy able to harm the beaver in its stoutly built island house.

Other animals, like the moose, turn to water for tidbits of food or to escape the hordes of flies and mosquitoes that plague northern summers.

DISTRIBUTION OF COVER AND FOOD

It has been shown that cover and food in adequate amount and of the proper kind are indispensable to wildlife existence. Moreover, the cover and food must be sufficiently near, one to the other, to be utilizable by wildlife. For any given territory to support maximum numbers of wildlife, it is essential, not only that cover and food stand in proper spatial relation, but also that the two be well distributed throughout an area. Neither an unbroken field of corn nor a large wood is capable of supporting wildlife in as great number and variety as is the same total area of field and wood well interspersed in smaller units.

Woody cover extended between the fields as hedge or well vegetated fence row or along a waterway, is a practical way of obtaining distribution. Ample proof of this is found in the countrysides of England and France, where an intricate pattern of vegetated field boundaries is spread like a giant net over the landscape. Here, although the land has been in continuous agricultural production for more than a thousand years, wildlife, particularly small birds, is strikingly abundant. Moreover, land in those countries, where the natural resources have not been considered inexhaustible, has been husbanded so carefully, that through the centuries it has lost little of its fertility.

In some European countries hedge planting and maintenance has long been almost a profession. The methods of caring for hedges, and of making them productive, as well as cattleproof, have been handed down from father to son for generations. Contrast this typical scene in France with the usual American countryside.

CHARLES R. ENLOW

VA—30,153

Narrow strips of cover, like hedges and vegetated fence rows, often are called travel lanes because they serve to give wildlife ready access to all parts of a terrain well supplied with them. It is by way of these travel lanes that insect- and rodent-eating birds and mammals move freely out into fields to hunt their food and thus assist the farmer where help is needed.

W.S—419

Some travel lanes of great value in summer may be poor in winter after the leaves have fallen, as on the left bank above.

NEBR–54

In some parts of the country travel lanes are naturally few and far apart. They may be confined to the draws and valleys, with little or no cover on the uplands.

In terrain such as parts of the Great Plains and the prairies, wildlife present, like the prairie chicken, takes advantage of cover available in the low places.

F&WS–B–4041–M

IMPORTANCE OF EDGES

Every farm boy knows the best place to look for quail or rabbits is along the edge of a field where it adjoins a woodlot, a hedge, or a brushy stream bank. This is equally true of most other kinds of upland wildlife—to such a degree, in fact, that wildlife has been termed a "phenomenon of edges."

By "edge" is meant the area of junction between distinct types of vegetation. The greater the difference between the types, the more marked is the "edge effect." Along the margins where fields and woods meet, farm wildlife reaches far greater abundance than in either the fields or in the woods. It is about the edges of ponds that waterfowl may nest, and in the edges provided by fence rows many birds and mammals may be found.

GA—10,078

Such a margin is illustrated by a corner of a Georgia farm. Here, however, the natural edge value has been deliberately enhanced by the planting of a strip of sericea lespedeza between the field crop and the border of shrubs to provide winter food for quail and cover for soil.

OKLA—6985

It is in field-woods margins that quail prefer to nest and rear their young. It is here too that the dogs are most likely to find the coveys in fall. And it is here that the birds seek shelter and food in winter.

MINN—952

The better types of travel lanes are essentially field-woods edges. In the form of hedges and well vegetated fence rows and waterways they afford, perhaps, the maximum possible extension of woody edge on agricultural land. The more edge there is, the more wildlife; the less edge, the less wildlife. Therefore, land patterns most likely to produce an abundance of wildlife will contain plenty of edge; which is another way of saying that there will be a variety of cover, well distributed and freely interspersed with food and water. It has been found possible, in fact, to double the wildlife population on a farm by judicious treatment of edges.

THE NEEDS OF THE LAND

In the last analysis, man and all his domestic animals, as well as all wildlife, depend directly or indirectly upon the thin stratum of productive soil that clothes the earth. This important layer is as thinnest tissue compared with the thick but sterile layers below it. Even so, many centuries were required for the few inches to accumulate as a result of the combined action of climate, vegetation, and animal life. Over the United States as a whole, its average depth is only about 7 inches, yet upon these 7 inches depends the security of the Nation. Our topsoil is a priceless heritage.

IOWA—769

We have discussed the needs of wildlife and have found the essentials to be cover, food, and water. The needs of the land are no less. A land clothed with a heavy mantle of vegetation, nourished by a deep rich soil, and well supplied with water, is a healthy, fertile land. Deprived of these essentials, it can become dry and sterile, exhibiting many of the characters ordinarily associated with deserts. On areas of eroded soil the slow natural processes of revegetation must begin all over again.

Thoughtless methods of using soil can undo in a few decades what natural processes required hundreds of years to accomplish. To tear down always is easier than to build, and this is especially true of soil.

WASH—35263

OKLA—5235

So long as land has adequate cover of vegetation, it will not wash or blow away. Once the protective covering is destroyed, however, water and wind set in to remove the vital topsoil. Under natural conditions, trees, shrubs, vines, grasses, and forbs may cover every square foot of ground; normally the dying of one plant makes way for another.

The original cover of vegetation that clothed the land of this country was predominantly grass or forest. Both offered excellent protection to the soil on which they grew and which they helped produce. Their destruction through overgrazing, unwise cultivation, and commercial clearing resulted in economic disaster and monumental soil losses. The process was all the more insidious because the initial stages were not easy to detect. That soil could thus be destroyed was a new concept.

R4—632

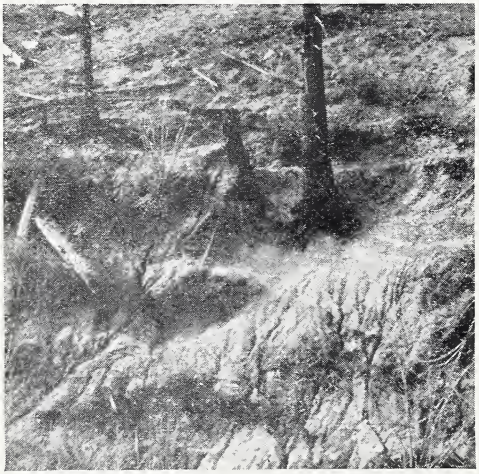
IDAHO—67

That virgin prairie grasses are capable of holding soil, even on very steep slopes, is evident still on many hillsides. But no matter how luxuriant originally, grassy cover is destroyed rapidly by continued unregulated grazing. The nutritious, palatable grasses are eaten away to their roots, and puddled soil begins to show between hummocks of less attractive plants. Grazing animals find less and less to eat, wildlife inhabiting the range is forced to leave, and gullies usher in the last stage of land destruction. Unwise cultivation, too, can turn western grassland into eroding fields.

M:D-[illegible].077

GA-5-17

Ungrazed, unburned forests are an invaluable type of soil cover, but these are easily destroyed, whether through carelessness, misuse, or deliberate abuse. Fire is the greatest enemy of the forest, destroying numberless trees annually.



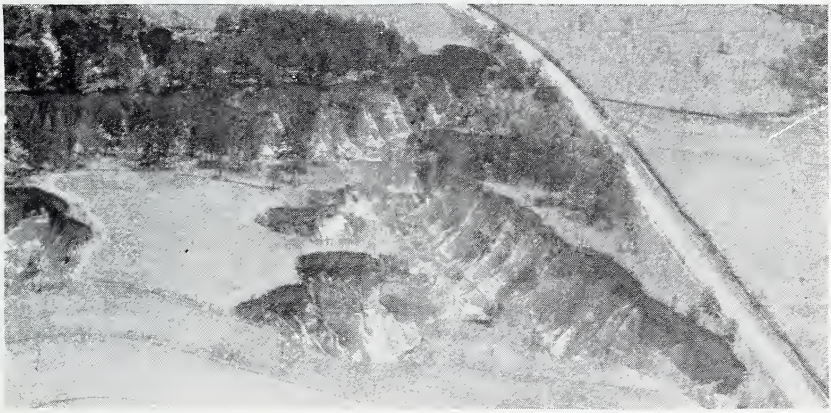
IDA-25,008

Uncontrolled fire can destroy cover more quickly and completely than any other agent. It destroys much wildlife too, and it leaves the burned area unfit for return of natural vegetation, often for a very long time. Erosive forces soon set in to remove soil that has taken centuries in its building. Burning crop residues is equally unwise on cultivated soil.

It is often possible to remove one kind of cover and replace it with another. Even a forest may safely be replaced by crops on some soils and gentle slopes, if the soil always is protected from the agents of erosion during the change.

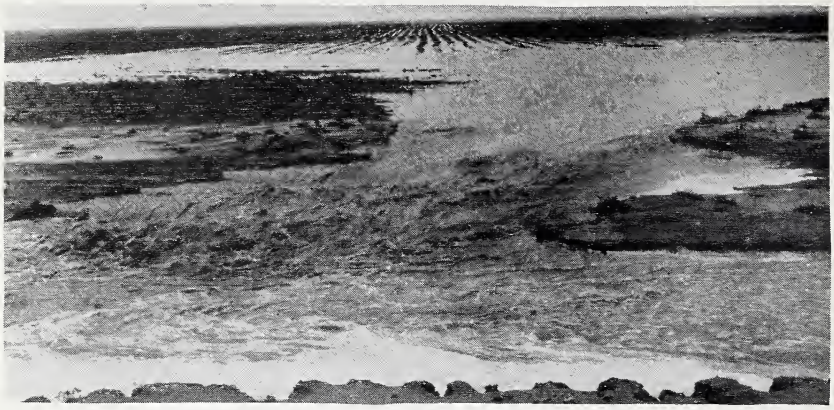
KY—30,268

Wrong cultivation—plowing up and down hill instead of on the contour—provides fallen rain with ready channels. As the water travels downhill it carries the soil with it; unchecked, small gullies thus started may become giant gorges difficult or impossible to control.



GA—20,176

Man-made erosion of this and other types has already ruined, or seriously impoverished, 282 million acres of land in the United States, an area larger than the combined areas of Texas and California. Another 775 million acres have lost from one-fourth to three-fourths of their topsoil. There are a few gullies in this country that extend across one county, and involve several others.



OKLA–276

When the land has lost its cover—and wildlife has lost a place to live—two things may happen to the soil: Either water begins to wash it downstream or wind begins to blow it into the air. In either case the best soil goes first.

WASH–10,022

It is clear then that cover—protection—is just as important to the land as it is to wildlife. The most effective cover, vegetation, cannot be maintained on land wanting in fertility and moisture. The land, like wildlife, needs food and water, food in the form of humus and mineral plant nutrients and adequate water stored in the soil itself. The three—cover, food, and water—are mutually dependent. Strip away the cover, and the food leaches out and the soil dries; impoverish and dry out the soil, and the reestablishment of the cover of vegetation becomes very difficult, as well as costly. Eroded land produces much less than land that has been properly protected. The whole wasteful process has resulted in much human misery that might have been avoided.

LAND USE PATTERNS

CROPLAND

There is no class of agricultural land that is entirely devoid of wildlife, or that cannot be managed so as to support a fair number of wild birds and mammals. There is, however, a large acreage of farm land that harbors little wildlife because the use pattern is unsuitable. Big fields planted to single crops are of such a nature.

IND—60,019

Land actively cultivated is subject to continual disturbance by tillage, by the harvesting of crops, by grazing, and often even by burning.

Great expanses of bare soil left clean after harvesting are easily eroded. Such places usually are devoid of wildlife, but for birds that attempt to glean a few seeds. The animals that brave these open expanses are in constant danger of attack by enemies, because there is no escape to protecting cover.

Yet some parts of almost every farm remain relatively undisturbed. Field boundaries marked by fence rows or hedges, drainageways, small areas too steep to plow, marshy spots that cannot be drained for cultivation, rock outcrops—these ordinarily are permanent parts of the land use pattern, and it is on them and such woodland as may have escaped burning or overgrazing that farm wildlife has depended, in large part, for survival.

As better farming practices bring about more intensive use of good land and the retirement of poor and unsafe land to a permanent cover of grass or trees, as strip cropping and rotations replace the old system of large acreages in a single crop, and as the realization grows that properly-managed hedges are an asset and not a detriment to a farm, the improved pattern will greatly enhance the wildlife potentialities of agricultural land.

OHIO—20,262

Strip cropping—the alternation of bands of close-growing vegetation with bands of clean-tilled crops on the contour—is coming to be widely and profitably used for conservation of soil and moisture. The close-growing vegetation prevents the washing away of soil that would occur were the whole field planted to a crop requiring cultivation. Interspersion of different types of vegetation is of definite wildlife benefit, because of the greater amount of edge and variety of food and cover offered. Strips that connect with hedgerows or woodland are particularly desirable. Actual counts in a number of fields in several States have shown that strip-cropped fields harbor twice as many nesting birds as large unbroken fields devoted to a single crop.

MISS—270

Edges of cultivated fields adjacent to most kinds of woodland produce little, since the tree roots claim the greater portion of moisture and plant food, and shade further prevents crop plant development. Seldom well-covered by crop growth, these edges are subject to erosion.

N C—50,088

Dedicated to permanent vegetation, however, field borders cease to be a problem. Strips of vegetation, like the perennial lespedeza here, offer food and nesting sites for wildlife, provide a place for turning farm machinery without injury to the crop, and, when properly maintained, prevent the adjoining woodland from invading the field.

MD—20,037

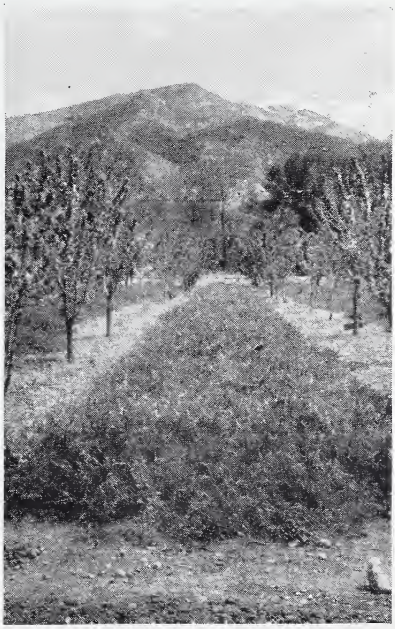
The vegetation protecting diversion ditches or terrace outlet channels—both soil conservation measures for conducting run-off water from cultivated land at safe velocities—provides increased edge effect and additional travel lanes to the benefit of farm wildlife. If the crop is not harvested during the nesting season, field birds may bring off their broods in such places and find refuge in them when pursued by predators. They produce much food for seed-eating birds and mammals.

N C—50,067

UTAH—454

In the far West, Southwest, and Rocky Mountains, the banks of irrigation canals and ditches provide habitat for animals that would otherwise have difficulty in finding a place to live. Besides protecting the banks from erosion and reducing evaporation, the vegetation offers both food and cover to wildlife.

Orchards have always been attractive to birds—sometimes to the detriment of the fruit. But, by and large, as compensation for this, insect-eating wildlife assists in keeping the trees free of pests. Orchards have been found to support a surprisingly high wildlife population. Good cover crops, properly managed, are invaluable in the conservation of orchard soils, and have wildlife value as well.



UTAH—100

MONT—2680

N DAK—191

Buffer strips of sunflowers, planted in the northern Great Plains, the Nation's wheat granary, to lessen wind erosion on these vast croplands, provide cover, as well as much food for wildlife, in a country often in dire need of both. Every bit of taller-growing cover is valuable, especially to wildlife in this region, particularly in critical seasons. Sometimes these buffers are used to protect young trees and shrubs while permanent windbreaks are being established. During the harsh winters, these strips trap and hold snow about the young trees and also serve to feed resident birds, as their tracks testify.

NEBR—277

Windbreaks, so effective in the protection of cultivated crops and in the prevention of wind erosion, have highly important wildlife values also. Whether planted on the Great Plains or in the far West, windbreaks and shelterbelts provide practically the only wildlife shelter in regions otherwise nearly treeless. Pheasants regularly use them as their headquarters. In some parts of the open wheat belt of the Northwest, these planted windbreaks present the nearest approach to woodland. Low-growing shrubs, producing food for wildlife, planted outside tree rows, make windbreaks more effective.

FS—349,393

OHIO—40,399

Here and there on almost any farm there will be found odd spots and rough places of little agricultural use. A bit of stony land, a marshy spot, a slope too steep to cultivate safely, or a gully head—these places form islands of wildlife cover, provide wildlife with food, and shelter animals that feed on insect pests in the surrounding cropland. Vegetation on steep slopes provides important protection for the soil on the slope and for the fields below. Remove the plant cover and soil begins to wash down on the cultivated field. Such areas must be accorded full protection from ax, livestock, and fire.

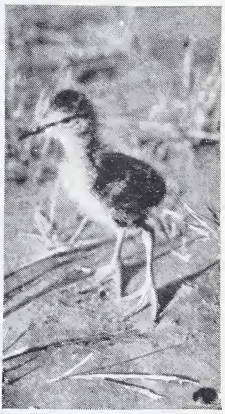
MINN—990

PA—100,209

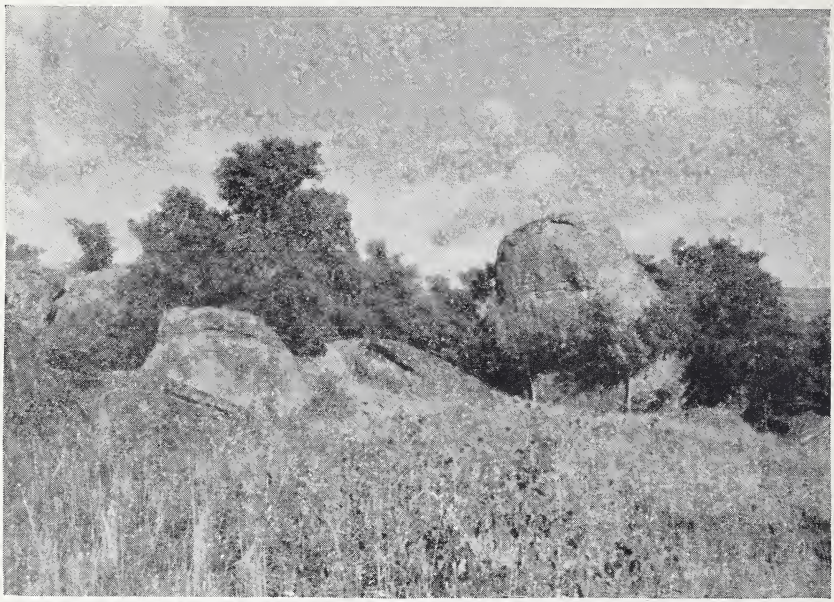
Marshy spots, though unsuited to cultivation, can be of considerable importance in the farm economy. If large enough to support muskrats, their management for fur production may be lucrative. Whatever their size, their peculiar animal life makes them of perennial interest.

NPS—6468

BS—B—3233M



NPS—1001



IDA—55,438

NPS—CHASE

Rock outcrops offer excellent living quarters for various kinds of birds and mammals, like the woodchuck shown, especially where the vegetation provides plenty of food and cover. Areas such as these, however, are worthless to wildlife unless they are protected from fire and livestock.

OH.O—1645

On abandoned or idle land that is protected from fire and livestock, natural processes set to work to reclothe the soil with vegetation. Progress, however, may be slow, depending on the amount of soil that has been lost. Wild lespedeza can be seen pioneering on a raw subsoil.

In course of time, plants of higher and higher stages of succession will follow. Eventually the areas will support trees of a kind that formerly grew there,—or grass, if the land was originally prarie.

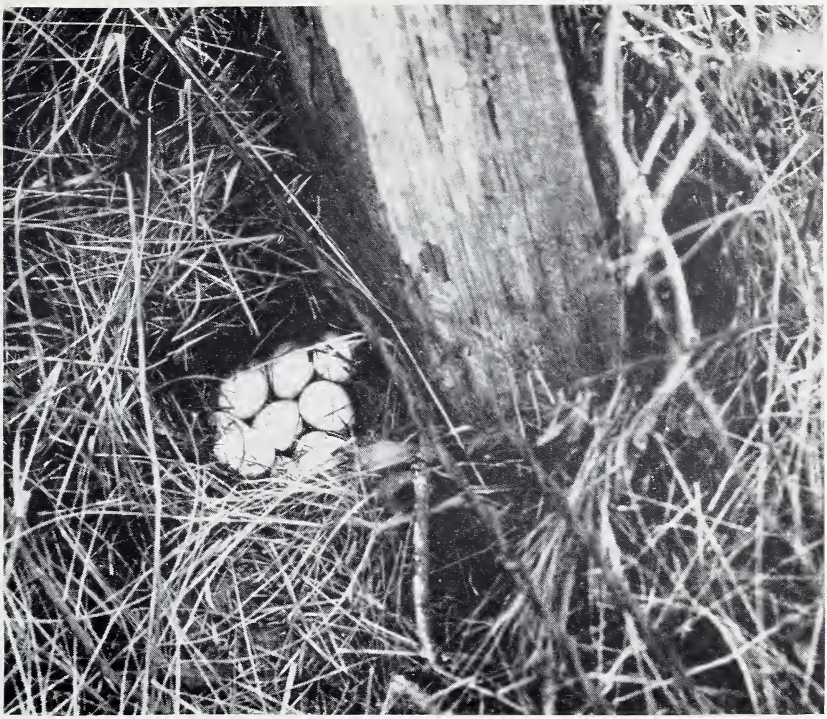
Such idle areas will support wildlife populations in proportion to the variety and luxuriance of the vegetation.

MO—1159

S C—20,409

Hedges and fence rows have been discussed and their great value as travel lanes shown, yet their wildlife importance in cultivated areas needs further emphasis. Lanes of cover, in which insect-eating birds and mammals can travel over a great expanse of otherwise open crop fields, should be encouraged. Were the hedges constructed on the contour instead of up and down hill, they would help to prevent soil washing. Using hedges in place of fences, for erosion control and for wildlife welfare, would do much to restore a better biologic balance on agricultural lands.

R2—155



MO—296

Many beneficial animals live and travel in hedges. Quail often build their nests in brushy fence rows. The bluebird hatches its brood in an old fence post and feeds upon the grasshoppers, one of the most destructive of all crop pests. A bird with a hungry brood makes scores of trips daily, returning each time laden with insects that might otherwise have gone on eating the farmer's crops. More hedges will mean more insect-destroying birds.

BS—B—12M

WIS-774

Too often, however, the farmer rewards his benefactors by thoughtlessly touching a match to the fence row that has given them shelter. Burning is the single practice most destructive of odd corners, hedges, fence rows, and other bits of cover that make wildlife possible on the average farm. It destroys soil cover and prevents the return to the soil of valuable organic material. Wildlife and uncontrolled burning are incompatible.

F&WS-B-57,763

RANGELAND AND PASTURE

N MEX—10,596

In the drier western half of the United States, where natural tree growth occurs only in the high mountains and along streams, there are vast areas used primarily for the grazing of domestic livestock. The topography is rugged over much of the country, and grazing animals commonly move seasonally between the high summer ranges and the wintering grounds at lower altitudes. All vegetation is sparse in comparison with the better watered regions of the East.

TEX—23,074

It was on these great western lands that the buffalo, elk, antelope, deer, and other game animals formerly ran free in such incredible numbers. The larger animals are now either confined to Federal and State parks or have been crowded into more mountainous areas, as a result of the settlement of the country by the white people and the consequent severe competition of domestic livestock.

FS—333,270

For big game animals such as the elk, adequate winter forage has become an acute problem since their wintering grounds have been taken over by cattle and sheep. For the land itself, the greatest problem is overgrazing, which already has resulted in extensive depletion of range vegetation and in widespread erosion.

In general, it can be stated that recovery of native vegetation on the western range is slow—much slower than in regions of higher rainfall. The balance between conservation and destruction is more nicely adjusted and, as a consequence, the pattern of use for these lands must be more skillfully arranged.

The intricate pattern of rangeland ownership adds to the complexities of the problem, as does the necessity for the development of measures that cannot be as intensive as those for the East. But unless the trend of range depletion soon is reversed, the end will be the destruction of the land itself.

N MEX—10,164

During the last 30 years, 76 percent of the western range has declined alarmingly in productive value. Too many cattle and too many sheep, grazed under improper methods of range management, are destroying the normally none-too-abundant vegetation. As the vegetation disappears, wildlife disappears with it. The appalling lack of cover, either for soil or for wildlife, is evident to even the casual observer.

N MEX—6905

TEX—7557

The trend can be reversed. With proper management and favorable moisture conditions, even seemingly hopeless pastures can be made to flourish again with luxuriant native grasses.

TEX—5157

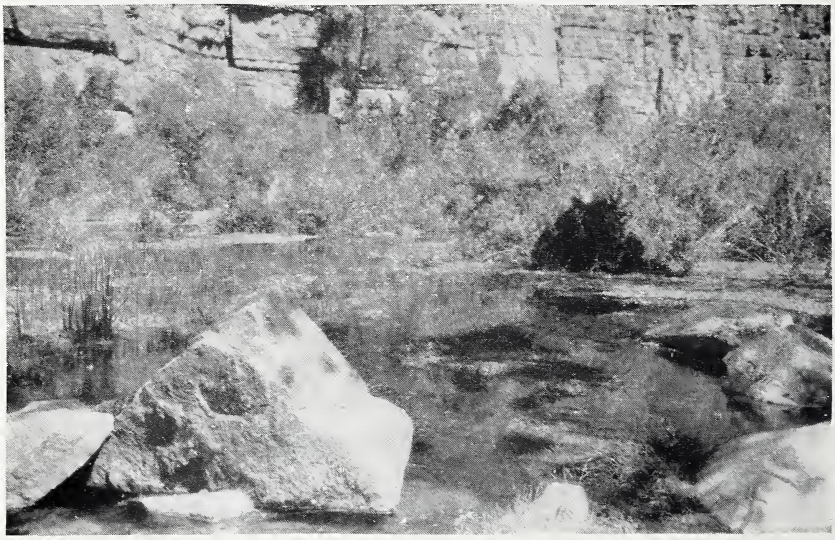
N MEX—5059

One of the first steps in correct range management is the reduction of livestock to the number that the land can actually support without injury to the vegetation. Photographic evidence of overstocking is conclusive in pictures showing the result of uncontrolled grazing on one side of a barbed-wire fence, and regulated grazing on the other. The equally adverse effect on wildlife and stock is as clear on the overgrazed side of the fence as the beneficial effect on the other. Such evidence has led to the conviction in some quarters that the barbed-wire fence is the best single tool in range conservation.

N MEX—9846

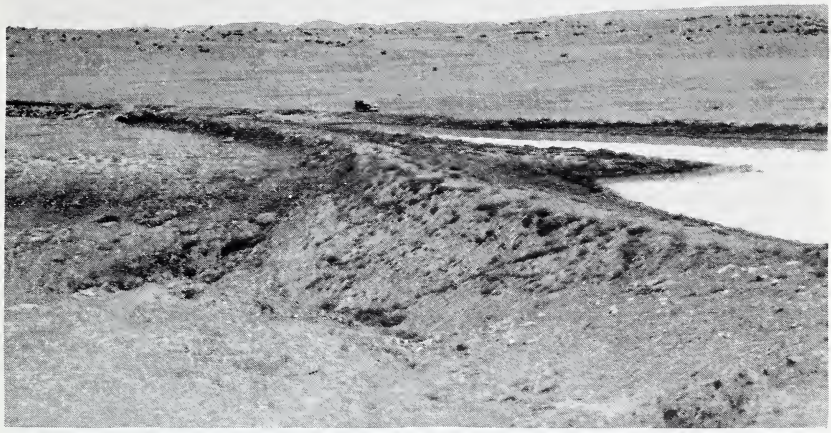
NEBR—193

Development of water is of great importance in the management of the range as a means of effecting more nearly uniform distribution of grazing. Both wild and domestic animals tend to congregate in the vicinity of springs, water holes, stock ponds, reservoirs, and along waterways. If watering places are well distributed, the range vegetation will not be overgrazed in some areas and used hardly at all in others.



AR.Z-215

When these water supplies are properly protected, they provide fine habitats for wildlife. Fencing watering places would permit shore vegetation to develop that would in turn make the areas available for nesting waterfowl. Water for livestock could easily be made accessible outside the fence.



10—MS—1539

In the more arid West, where vegetation at best is sparse and every drop of water is at a premium, the conservation of rainfall becomes vital. The utilization of storm waters by diverting the flash flows from eroding arroyos and spreading them over nearby flats will produce luxuriant growths of such native grasses as blue grama and provide more and better food for both livestock and wildlife and better protection to the soil.

N MEX—9463

BS—B—44.889

Range wildlife, like the range itself, responds readily to good treatment. Even the timid antelope, once reduced almost to the verge of extinction, has staged a remarkable come-back in places where it has been permitted adequate forage and given rigid protection. Were due allowance made for their needs, there is little doubt that reasonable numbers of these fine game animals could reoccupy much of their former territory.

Some animals, like the buffalo, have been driven from the range entirely, and now exist only in refuges.

Biologists believe there were once at least 60 million buffaloes in what is now the United States. Obviously such great herds could never remain on prairies that were being converted to farming. Like many other large, wide-ranging animals these great beasts have lost in the battle with civilization. Even on refuges, however, care must be taken to provide adequate range for these animals.

BS—21733

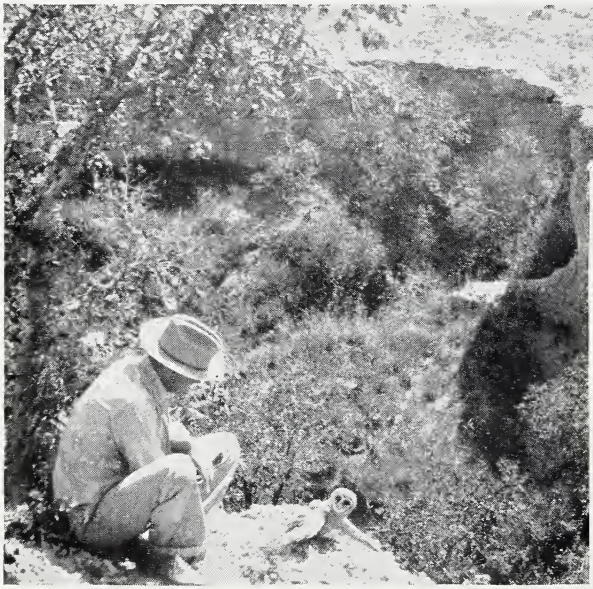
S DAK—10,163

Deer are still numerous in the West, but have been driven to concentrate in the higher ranges where competition with domestic animals is not so keen. These abnormal concentrations result in overbrowsing, as indicated by sharp browse lines on the aspens.

N MEX—10,597

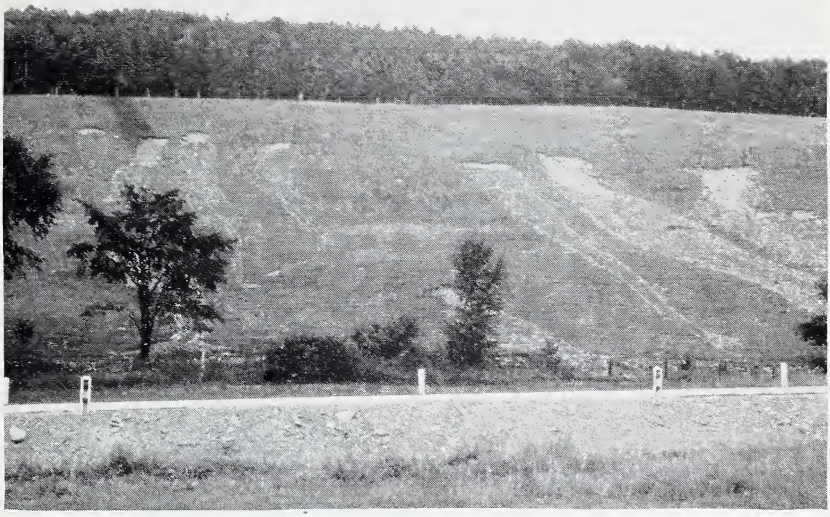
N MEX—10,598

As on eastern farms, so also on the ranches of the West are found many rough spots and broken areas that serve little purpose in the agricultural economy. In the West these areas are as vital to wildlife as their farm-land counterparts in the East. In some areas, where broken terrain makes access by domestic stock difficult, whole mountains are dedicated to wildlife use. Smaller spots could with profit be reserved to wildlife. A box canyon might become a haven for most of the wildlife for miles around, such as the quail and the barn owl in the figure. As with their eastern counterparts, these areas must be protected from grazing if they are to be most useful to wildlife.



TEX—5164

TEX—23,250



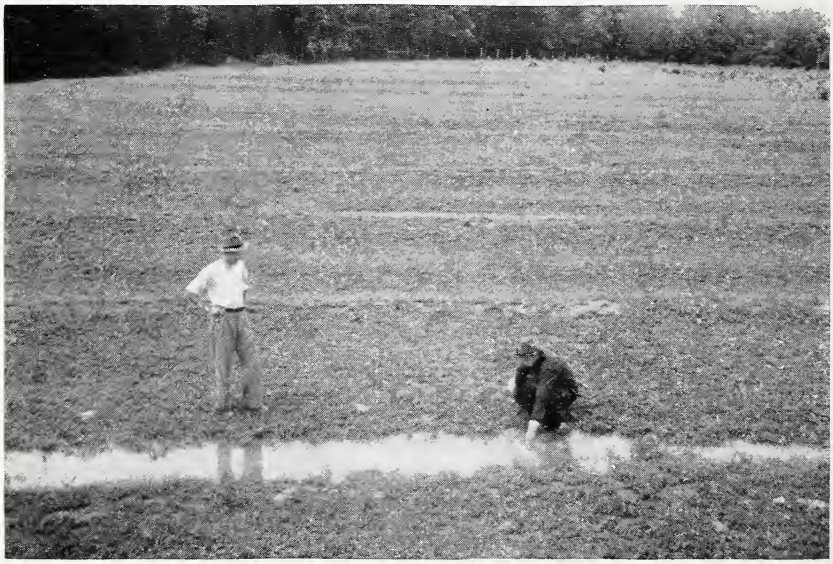
36,483

In the humid eastern half of the United States the immediate results of overgrazing may not be so spectacular or so disastrous—either to animal life or soil, but if overgrazing is continued it will lead to the destruction of the land.

VA-10,135

MISS—40,078C

The more favorable moisture conditions of the East, however, make it relatively easy to build up and maintain good pastures. Such pastures provide better forage for livestock, protection for the soil, and very good habitat for certain kinds of wildlife. Small closely-spaced contour furrows are recommended for sloping pasture land.



VA—20,205

WOODLAND

FS-352,583

Mature forest is a magnificent expression of plant growth. When unabused it provides a soil cover that is one of the best types of watershed protection. With its dense canopy overhead to break the force of rain, and its mat of organic matter spread over the soil to maintain its porosity and cause surface flow of water to percolate into the soil, it reduces run-off, prevents soil losses, lessens flood crests, and regulates stream flow.

While forest is not the type of cover pattern most productive of wildlife—as some believe—it does harbor a substantial variety of wild creatures, many of which, like the thrushes, are seldom found elsewhere.

BS-B-48,876

KY—20,392

Woodland most attractive to wildlife is characterized by trees of many different ages, a good understory of shrubs and young trees, and a great variety of different species of trees, shrubs, and lesser plants. This will explain why plantations of a single tree species and a single age class are markedly deficient in wildlife. Such plantations may suffer great loss from disease and pest attack and eventually lower soil fertility instead of improving it.

PA—100,249

OHIO—1957

The litter of rotting twigs, dead leaves, and other decaying vegetation—duff—on the forest floor forms a thick absorbent layer that does the most to make forest preeminent in the protection of watersheds and the conservation of soil. From it spring the tree seedlings on whose survival the perpetuation of the forest depends. Yet duff is easily destroyed by fire and deteriorated by livestock and by heavy winds blowing through thin stands.

The terrible destruction of life and property by great forest fires commands the grave concern of all people. Following such fires, erosion adds to the desolation and the difficulty of revegetating the land.

41ST DIV. AVIATION, WASHINGTON NATIONAL GUARD

N Y-20,358

Next to fire and the unwisely wielded ax, livestock is the greatest enemy of woodland. The country over, it is the custom of farmers to turn stock into the woods, which are then called pastures; but, as is well known to animal husbandmen, a woods pasture can be neither good woods nor good pasture. Woodland offers grazing much inferior to open grassland, and pastured continuously, loses all semblance of woodland character. Grazed woodland is marked by trampled and puddled soil, decreased litter accumulation, lack of undergrowth—by the absence of most of the things that make for the production of wood products, and the protection of wildlife and of soil.

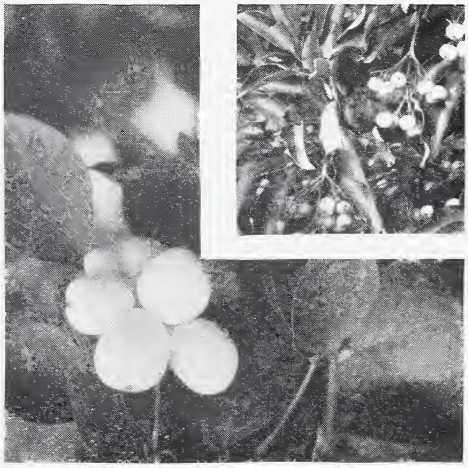
9-373

On sloping lands, erosion is a logical result of pasturing woodland. It is important to recall that the effective layer in a woodland is the layer of humus on the ground. This layer is destroyed by cattle.

14-862-A

Small openings in otherwise unbroken woodland add a valuable wildlife feature to the pattern. Around the edges of these openings may be found many wild creatures missing in the forest proper. Variety of vegetation and well-filled "edge" are the additional attractions.

Of all the parts of a woodland, the most important as far as many kinds of wildlife are concerned are the edges. Woodland margins are particularly attractive to many birds and mammals that find food and shelter in the thick border growth. Shrubs, such as the dogwoods (left), hazels, viburnums, wild cherries, plums, snowberries (right), and sumacs provide a wealth of food and cover.



MD-25,060 55,386

Shrub borders, when well-developed, prevent winds from sweeping through the forest to dry or blow away the litter, an erosion-control result of considerable value. They also crowd against the outer row of trees and cause them to lose their lower branches and hence produce better timber. And they prevent the tall and long-rooted woody plants from shading and sapping adjacent cropland.

New woodland plantations are planned best with a border of such shrubs. On existing woodlands borders often can be developed by placing the fence far enough outside the trees to permit natural reproduction.

OHIO—30,381

PONDS, LAKES, AND RESERVOIRS

Ponds, lakes, reservoirs—any bodies of water of whatever size—are exceedingly attractive to a great many wild creatures. Fish and other aquatic wildlife make their home in the water itself; wild fowl live and breed along the shores; and a host of other kinds of wildlife is attracted to these bodies of water by the better food and cover conditions, if not by the water itself. Therefore, whatever other purpose they may serve—whether it be for storage of water for domestic use or livestock, for irrigation, or for prevention of excessive erosion—their wildlife potentialities are very great. To realize these potentialities, however, a water place must be properly managed. When so managed, wildlife response is prompt and often amazing.

Wildlife frequenting ponds, lakes, or reservoirs is usually present in numbers roughly proportional to the length of shoreline. Here, as elsewhere, it is the "edge" that is most important. Where water-loving plants meet the plants of the drier shores, the margin is of greatest value to the greatest variety of wildlife. Usually, the more vegetation there is, the more wildlife. Adequate protection of the shores to preserve this vegetation is the most important management measure for pond-loving wildlife. It is also an assurance that the shore itself will be protected.

N DAK—10,033

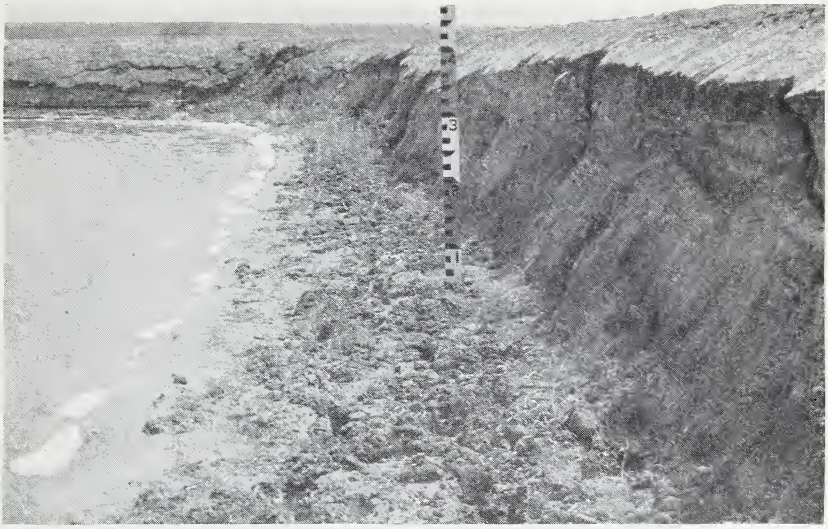
Whenever livestock have unrestricted use of shores, the vegetation not actually eaten is trampled down, the water is fouled, and the puddled, unprotected soil is "walked" into the water by the animals. The effect on wildlife that might live along the shores or in the water is obvious.

N MEX—8994

CALIF-3712

The principal enemy of reservoirs, large or small, is sediment. The life span of any impounded water is directly proportional to the sediment load of its feeder streams. When these rise at sources and flow through lands depleted of their protective vegetation through unwise land use, sediment fills the reservoirs in a few decades.

22-271



COLO-6099

MO-1137

COLO-486

Wave action on shores unprotected by vegetation is an important contributing factor in the siltation of reservoirs. Small reservoirs are as liable to this damage as large ones. The extent of shore erosion is roughly in proportion to the size of waves developed. Wave action may be economically and effectively prevented through planting protective bands of vegetation along the shores, both in the water and on the shore. It may be necessary to reinforce such protection by mechanical means in the larger reservoirs, particularly on the face of earth fills. Where shores are planted, the mallard may nest.

IND—795

Wherever it is feasible, pond environs should be protected against livestock, fire, and any other disturbance, even though their primary use is to provide water for cattle or sheep. This can be accomplished in a practical way by piping the water to a tank placed outside a fence that encloses the water area and a good margin of shore.

TEX—23, 189 ILL—1112

The marginal vegetation will guard the shores against wave action and the shrubs and trees that have been planted in the enclosure will grow tall enough to protect the stored water in fair measure from excessive evaporation by dry winds. The water will be clear and suitable for fish and the whole fenced area will form a fine habitat for both birds and mammals. When given such treatment, scarcely any pond is too small to support a family of waterfowl or produce at least some fish.

It is important to remember that malaria-carrying mosquitos may breed along the shores of ponds in the South. This means that steps must be taken to avoid increasing the carriers of a disease. Fish will eat the mosquito larvae, if there is no place for the "wrigglers" to hide. Where ponds are developed in the South, public health requires elimination of vegetation at the immediate margins of the ponds. However, the sloping shores still can be protected by shrubs or herbaceous plants, and the watersheds above the ponds should be planted to soil-conserving grasses to prevent silting. To avoid injurious wave action, ponds can be built smaller in size. Protection of the ponds and its environs from livestock results in longer-lived ponds.

In the South, too, in order to produce the greatest possible poundage of fish, it has been found desirable to improve fish food in the form of microscopic life by adding fertilizer to the water.

WASH—35,158

From the deep South to the Pacific Northwest, the farm pond will call irresistibly to all who follow in the steps of Izaak Walton.

STREAMS

Throughout the history of America her streams have played a vital role in the development of the country. The fishing, hunting, and trapping that they offered, greatly aided the work of the early explorers, in fact was often their reason for coming. For the settlers who followed, the waterways were generally their only available routes of travel. Even today the larger ones are important arteries of commerce.

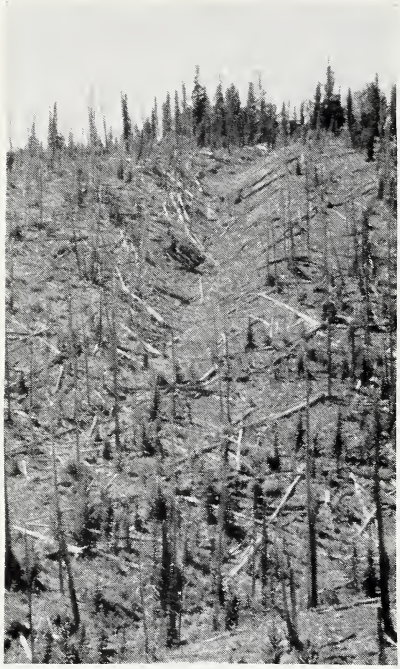
OHIO 20,367

For wildlife, the pattern traced over the land by the infinitely branching network of streams is no less important. While still unpolluted, they teemed with fish and other aquatic life. The pathway they cut through virgin forest let in sunlight which stimulated the growth of varied shrubbery along their banks—"edge" ideal for wildlife. Along their courses long fingers of forest were able to work their way across plains and provide precious shelter in otherwise treeless land. Man has since played havoc with a great many of these streams.

WYO-61

Normally, the banks of the streams were covered with a mantle of luxuriant vegetation that enabled many of them to hold against the floods of the early days and to convey the excess rainfall toward the sea without bringing injury to themselves or ruin to the lands below. Such streams offered to wildlife—as to the raccoon below—excellent cover, abundant food, and clean water.

INDIANA DEPARTMENT OF CONSERVATION



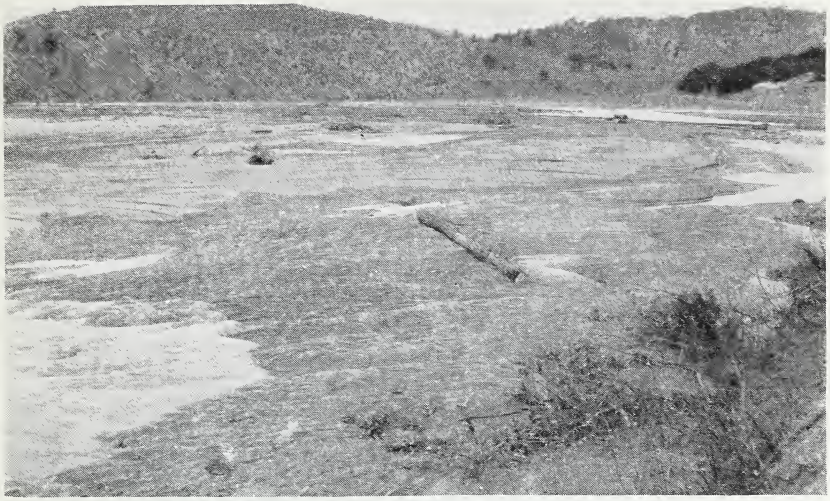
WASH–20,010

CALIF–7–107

WIS–1–48

OKLA–5851

Unfortunately, the economic need to wrest some financial return from every foot of land has made such protection uncommon. Unwise clearing of forest, improper tillage practices, pollution of stream sources, removal of protective vegetation by grazing, and cultivation of banks to the brink with resultant sloughing—these abuses of the Nation's heritage have operated to the detriment of the land, the streams, and wildlife.



GA—40,015

Sediment-laden streams change their channels, widen, and become shallower. Unless the degrading process is checked, both banks and channel disappear and the stream becomes a muddy trickle over wide beds of sand.

S C—30,081

Where storm waters race unchecked down barren slopes, floods develop more often and more seriously than is natural. Floods cover good agricultural land with silt, sharp sterile sand, rocks, and debris, ruining them or making reclamation difficult and expensive.

In suspension, sediment occludes the light necessary for the development of food for fish; settling to the bottom, it blankets their spawning beds.

Terracing and contour cultivation, strip cropping, good rotations, and all other soil conservation practices are stream management measures. By zealously applying these measures, guarding our stream banks from fire and grazing, and supplementing deficient cover with judicious planting, surprising changes may be effected.

MINN—789

Many small streams, although severely damaged, can be restored. Then may the fisherman return.

55,616

GULLIES

KY-518

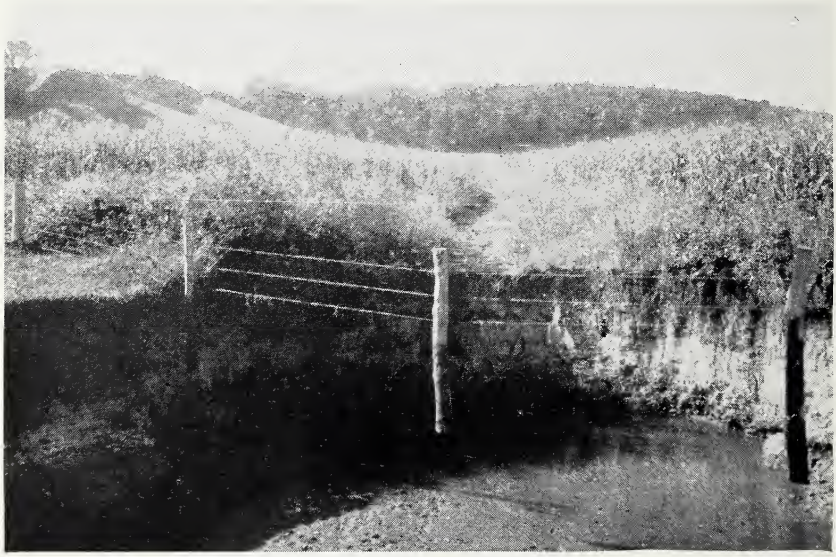
Gullying marks the final stage of land destruction. Gullies are part of a wasteful agriculture. They are the ultimate result of careless use of our basic asset, the soil. Their progressive development is accompanied by a lowering of the standard of living and, finally, general poverty.

The same forces that lead to such severe erosion result in the depletion of wildlife habitats. The destruction of vegetation by gullies deprives wildlife of food and a place to live.

Gullies indicate, and result from, misuse of the land above. They cannot be healed by filling them with tin cans and old automobiles. When proper conservation measures are applied to the area they drain, then, and then only, can they be made to serve a useful purpose. Otherwise, like a malignant sore, they continue to grow. Their healing may take a much longer time than is required to form them.

MINN—739

The rapidity with which gullies grow is often hard to believe. Photographic evidence shows that a gully in Minnesota, although draining but a small area, advanced 15 feet and doubled its width in the three months that elapsed between the taking of the pictures on this page. The soil that was washed away was some of the richest in the Midwest.



MINN—876

WYO—177

Similar evidence shows a gully cut on an overgrazed Wyoming range by a single heavy spring storm.

A 48-hour wash on an Oregon winter-wheat field with a 5 percent slope cut a gully 8 feet deep and 15 feet wide.

OREG—40,006

WI-1-221

When the watersheds draining into the gullies have been placed under proper soil-conserving practices, the gullies may then be healed by protecting them from livestock and fire and planting them to some type of useful vegetation. Three years of recovery in a Wisconsin gully changed the land pattern markedly for the better. The prevention of further cutting and the planting of properly selected vegetation provided a good habitat for certain kinds of wildlife. Such an area must have continued protection for many, many years.

WI-550

ILL-1265A

Where large areas are severely gullied, similar measures must be taken to protect the exposed soil. Timber trees planted as seedlings on an Illinois farm show real growth after 3½ years. Such areas, too, offer excellent territory for many species of birds and mammals.

ILL-1265B

ILL—656

With a small outlay for labor and materials, a destructive gully may even be converted into a fishpond, thus completely changing the land use pattern and turning a steady loss of good agricultural land into a constant source of pleasure for the farmer and his growing children. The ugliness of the gully will be hidden in the new beauty of the landscape.

ILL—656B

CONCLUSION

The three centuries that have passed while the American frontier moved westward have brought us finally to the necessity of a profound readjustment in our earlier national thinking. During those three hundred years it seemed as though the resources of this vast country were limitless, that expansion of the frontier would always serve to furnish us with new and virgin land. Today we no longer live in a territorially or agriculturally expanding nation. We now realize that our future security depends upon our ability to conserve, to use wisely, that which we may not already have squandered.

The numerous complex problems involved in the conservation of our land resources can never be solved independently. The old piecemeal solutions, tried so often, have signally failed. These are problems so closely related and interdependent that a final solution of one is impossible without a thorough understanding of all.

No class of land has been found that cannot support at least some wildlife. Use patterns productive of wildlife have been developed on intensively used truck cropland, and on the semi-wild land of great southwestern ranges. Extremely valuable land, supporting highly specialized crops, has been found capable of producing wildlife, as have apparently worthless gullies on run-down, submarginal farms. Wildlife can be produced over and above other crops occupying the same land, as long as the pattern of use is planned so that the full potentialities of the land finally may be realized.

To many, the problems of wildlife conservation have seemed to require particular solution separate and apart from other conservation problems. But wildlife conservation is coming to be understood as only one aspect of the larger question of land use, depending for its successful accomplishment upon the proper use of other land resources. Where agriculture is out of balance, planning for wildlife will not be fruitful. But where measures for the conservation of wildlife are properly integrated with successful land management, wildlife will thrive.

F&WS—B—36,612